Notes on hypopi (Acarina) associated with bees and wasps (Hymenoptera)[1]

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Abstract: Nine species of hypopial nymphs belonging to the families Acaridae, Chaetodactylidae, and Saproglyphidae are described as new: *Kuzinia* **affinis**, *K.* **americana**, *K.* **dispar** (Acaridae); *Vidia* **utahensis**, *Schulzea* **zahkvatkini** (Saproglyphidae); *Sennertia* **americana**, *S.* **ignota**, *S.* **indica** and *S.* **robusta** (Chaetodactylidae). A new subgenus, *Euvidia,* is established for 3 species in the genus *Vidia*; and *Vidia thomasi* is proposed as a new name for *Vidia cooremani* Baker in the Saproglyphidae. Hymenopterous hosts and figures of each species are given.

The hypopial stage or resting stage is a specific feature in the developmental cycle of the free-living Acaridae. It is formed between protonymph and tritonymph and is markedly different in structure from the nymphs or adults. The hypopus lacks functional mouthparts and has a suctorial plate on the venter of the body by which it attaches to the hosts. Obviously, in all mites which form hypopi, the hypopial stage assists in the dispersal of a species by attaching itself to the body of the host. Several species of mites belonging to the Acaridae, Chaetodactylidae and Saproglyphidae in the nymphal and adult stages are predators of wasps and bees. They kill the host eggs or larvae and then multiply and develop as scavengers on the food stored by their hosts (van Lith, 1957; Hirashima, 1957; Krombein, 1962a, b). However, in at least the Saproglyphidae, the symbiotic relationship between mites and wasps host is very complex (Krombein, 1961). The life cycle of the mite is successfully adjusted to that of the host, and the adult wasp host has an acarinarium on or in the body where the mites are arranged in layered rows (Krombein, 1961).

The discovery of new hypopial nymphs associated with different species of

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bees and wasps has prompted us to present this paper. Nine species belonging to the families Acaridae, Chaetodactylidae and Saproglyphidae are described as new. A new subgenus *Euvidia* is established, and a new name *Vidia thomasi* for *Vidia cooremani* Baker (preoccupied) is proposed in the Saproglyphidae.

Family Acaridae

Genus *Kuzinia* Zakhvatkin, 1941.

The genus *Kuzinia* was established for a single species: *Hypopus laevis* Dujardin, 1849. The male has anal copulatory suckers similar to those of *Aleuroglyphus* Zakhvatkin, and the larva has certain features found in the larvae of *Aleuroglyphus* and *Tyrolichus* Oudemans (see Zakhvatkin, 1941:127). The hypopus may be recognized by having large empodial claws on tarsi I–IV, small dorsal body setae and completely closed and widely separated coxal fields III. Coxal suckers are lacking; these are replaced by tiny setae. The gnathosoma is hidden ventrally, divided distally and may be segmented. The genus has not been previously reported outside the Palaearctic region; 3 new species are being described from North America. The hypopi were taken from different species of carpenter and bumble bees.

Kuzinia **affinis**, n. sp.

(Figures 1–7)

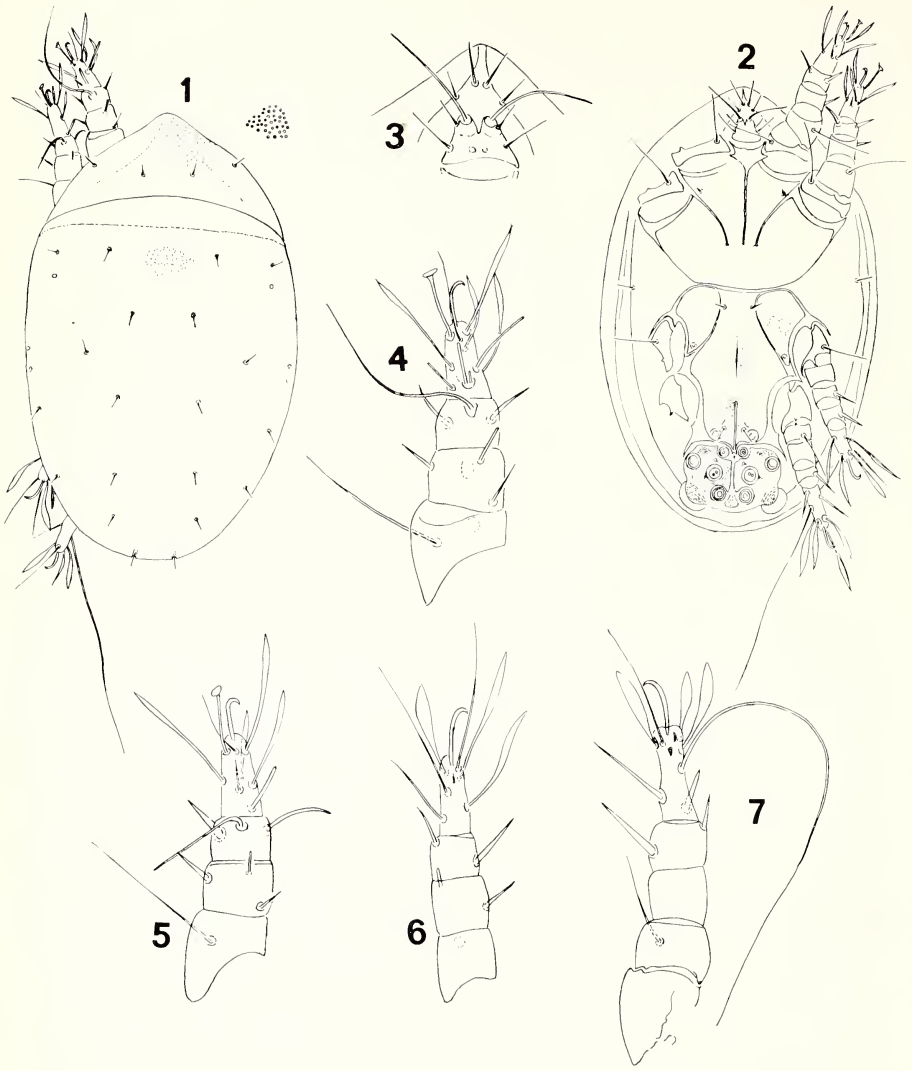
Hypopus. Idiosoma 281 μ long, 191 μ wide; elongate oval. Propodosoma and hysterosoma covered with minute punctations; all dorsal setae very small; chaetotaxy as figured, with d_2 widely separated from d_1, setae *Sai* removed from posterior edge of hysterosoma. Gnathosoma divided distally, unsegmented, with 2 long distal and 2 short lateral setae. Sternum thickened anteriorly at gnathosoma, the posterior end long, reaching as far as free ends of coxal apodemes II as figured. Coxal fields III closed, wide apart; genital field with free, longitudinal thickening at middle. Coxal suckers lacking, replaced by tiny setae. Suctorial plate wider than long, well sclerotized, with 3 pairs of suckers on the plate and 1 small pair on the open portion; a pair of suckers and setae located above the plate. Legs with large empodial claw on each tarsus. Tarsi I–II each with 1 long sucking seta and 4 narrow, lanceolate setae; tarsi III–IV each with 3 lanceolate setae. Tibia I with a strong and long dorsal seta. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 0; Genu–3, 3, 1, 0; Tibia–3, 3, 2, 2; Tarsus–7 (3), 7 (1), 6, 7.

Adults. Unknown.

Holotype. Hypopial nymph, Lakeville, New York, August 10, 1927, taken on *Bombus perplexus* Cresson by M. D. Delfinado. Deposited in New York State Museum & Science Service, Albany.

Paratypes. Twenty hypopial nymphs with same data as holotype; 14 hypopial nymphs, Kerner, New York, September 18, 1901, taken on *Psithyrus laboriosus* (Fab.) by M. D. Delfinado (on 2 sides mixed with *K.* **americana**, n. sp.); 10 hypopial nymphs, Speculator, Adirondack Mountains, New York, August 10, 1909, taken on bumble bee by M. D. Delfinado. Deposited in U.S. National Museum and New York State Museum & Science Service collections.

Remarks. The large size, shape of idiosoma and length of sternum will readily separate *K.* **affinis** from *K. laevis* (Duj.) and *K.* **americana** n. sp. *K. laevis* has 6 lanceolate



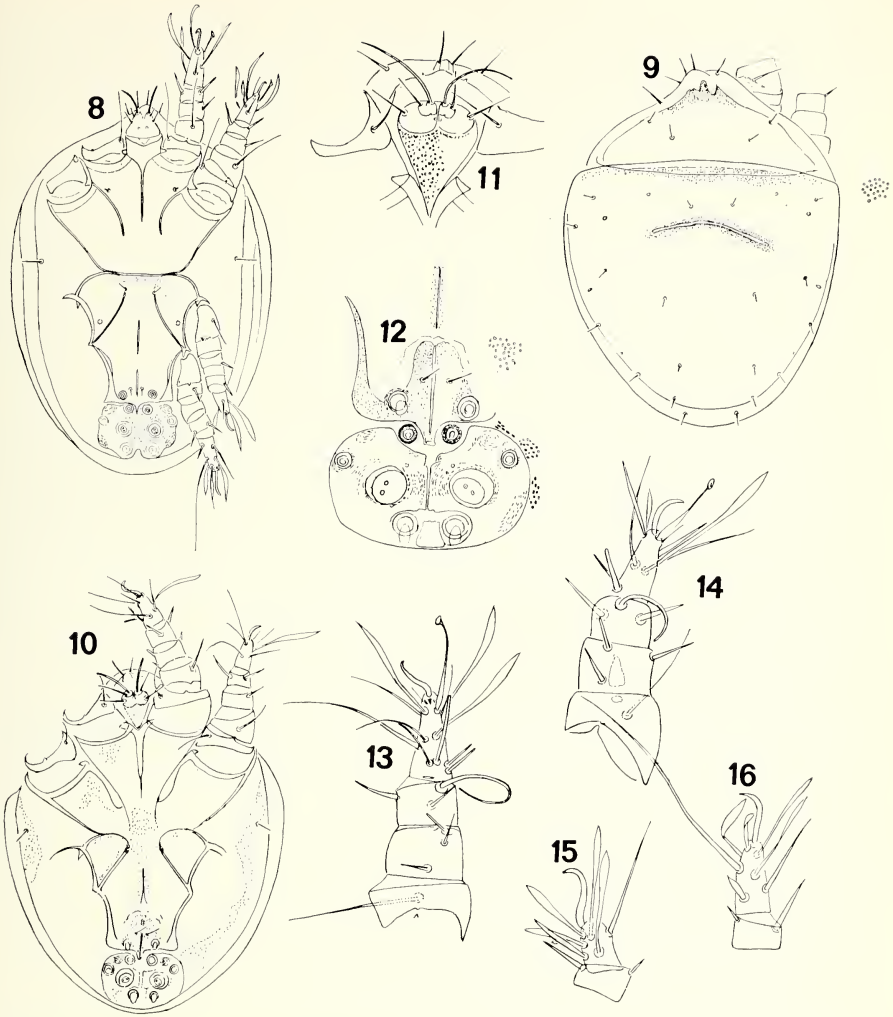
Kuzinia affinis, n. sp. 1, dorsal view; 2, ventral view; 3, details of gnathosoma; 4, leg I; 5, leg II; 6, leg III; 7, leg IV.

setae on tarsus III, 4 and IV, and 3 each on I–II; whereas **americana** and **affinis** both have 3 lanceolate setae on tarsi III–IV and 4 each on I–II.

Kuzinia **americana**, n. sp.

(Figure 8)

Hypopus. Idiosoma 223 μ long, 185 μ wide. Very similar to that of *K. affinis*, differing by the small size and broad hysterosoma, not narrowing posteriorly. Sternum short, not



Kuzinia americana, n. sp. 8, ventral view.

Kuzinia dispar, n. sp. 9, dorsal view; 10, ventral view; 11, details of gnathosoma; 12, details of suctorial plate; 13, leg I; 14, leg II; 15, tibia and tarsus III; 16, tibia and tarsus IV.

reaching free ends of coxal apodemes II. Seta *Sai* close to posterior edge of hysterosoma. Other characters are as in *K. affinis*.

Adults. Unknown.

Holotype. Hypopial nymphs, Kerner, New York, June 1928, taken on *Psithyrus laboriosus* (Fab.) by M. D. Delfinado. Deposited in New York State Museum & Science Service, Albany.

Paratypes. Twenty hypopial nymphs, Keene Valley, Essex Co., New York, August 5, 1889, taken on *Bombus vagans* Smith; 10 hypopial nymphs, Albany, New York, May 22, 1930, taken on bumble bee; 10 hypopial nymphs, "Lar. So. Colorado foot hills", no other data, taken on bumble bee, all were collected by M. D. Delfinado. Deposited in U.S. National Museum and New York State Museum & Science Service collections.

Kuzinia ***dispar,*** n. sp.

(Figures 9–16)

Hypopus. Idiosoma 274 μ long, 217 μ wide; broad oval. Propodosoma and hysterosoma minutely punctate; all dorsal setae very short; chaetotaxy that of a typical acarid as figured; seta d_2 displaced anteriorly and close to d_1; *Sai* near posterior edge of hysterosoma. Gnathosoma with shape and structure as figured, segmented and divided distally, bearing 2 pairs of distal setae and 1 pair basally. Sternum thickened, y-shaped with tip reaching as far as free ends of coxal apodemes II; coxal field II with faint indications of being closed, III closed and wide apart medially; coxal setae or suckers completely lacking. Genital field with free, longitudinal thickening at middle. Suctorial plate wider than long, well sclerotized, 3 pairs of suckers inside plate and 1 pair on open portion; 1 pair of suckers and setae just above the plate. Legs I–II robust; all legs with large empodial claws and well-developed stout setae. Tarsi I–II each with a peculiarly developed sucking seta—broadly lanceolate at basal half with a sucker at its terminal point, and 3 lanceolate setae; tarsi III–IV each with 4 lanceolate setae. Distal dorsal seta on tarsus IV not as long as that of other members of the genus. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 1; Genu–3, 3, 1, 0; Tibia–3, 3, 2, 2; Tarsus–12 (1), 9 (1), 7, 7.

Adults. Unknown.

Holotype. Hypopial nymph, U. S. National Museum type no. 3684, Kanda Ghat, Himachal Pradesh, (no date), taken from bumble bee (PL–480, Hissar, India), sent by F. D. Parker, USDA, Logan, Utah.

Paratypes. Two hypopial nymphs, with the same data as holotype. Deposited in U. S. National Museum collection.

Remarks. At present this new hypopus is being included in *Kuzinia* even though there are differences found on gnathosoma, type of leg setae and body chaetotaxy.

Family Saproglyphidae

Genus *Vidia* Oudemans, 1905.

Zakhvatkin (1941) divided the genus into 2 subgenera based on the type and number of flattened setae on tarsi I, II & III, structure of pretarsi I & II, and presence or absence of eyes. Nine species are included in the genus *Vidia,* and all but 1 species are known only from hypopial nymphs. A new subgenus *Euvidia* is established here for 3 species: *Vidia cooremani* Baker, 1964, *V. concellaria* Cooreman, 1948 and *V. utahensis,* n. sp., *Vidia cooremani* Baker, 1964 is preoccupied by *Vidia* (*Coleovidia*) *cooremani* Thomas, 1961 equals *Hemisarcoptes cooremani* (Thomas) in Hemisarcoptidae. We are therefore proposing *Vidia thomasi,* new name for *Vidia cooremani* Baker, 1964, not Thomas, 1961.

The 3 subgenera of *Vidia* may be separated as follows:

1. Tarsi I–II each with 3 lanceolate setae; pretarsi I–II small and normal in structure (on bees) ..... *Vidia* s. str.

2. Tarsi I–II each with 2 lanceolate setae; pretarsi I–II long, widened distally forming a spoon-shaped sucker (on *Crabro wasps*) ..... *Crabrovidia* Zakhvatkin.

3. Tarsi I–II each with only 1 lanceolate seta; pretarsi I–II large, bulbous (on sphecid wasps) ..... *Euvidia*, n. subg.

Subgenus *Euvidia,* n. subg.

Type-species, *Vidia* (*Euvidia*) **utahensis**, n. sp.

This new subgenus has the following features: eyes absent; tarsi I–II each with 1 lanceolate seta, III with 4 such setae; pretarsi I–II large and bulbous; pretarsus III small; tarsus IV without empodial claw but with very long, whiplike seta distally. Other characters as for the genus (see Zakhvatkin, 1941; Cooreman, 1948 a, b).

Vidia (*Euvidia*) **utahensis**, n. sp.

(Figures 17–23)

Hypopus. Idiosoma 217 μ long, 140 μ wide; ovoid. Dorsally with typical broken striate pattern and covered with minute punctations, transverse on prodosoma and longitudinal on hysterosoma; all dorsal setae very short with an acarid type arrangement: d_1 almost laterad of d_2, *hi* & *he* marginal, *Sai* & *Sae* dorsal, marginal, *pa* ventral. Gnathosoma lacking, represented by 2 long and 2 minute setae as figured. Sternum y-shaped, free; coxal field II closed posteriorly; coxal apodemes III & IV united medially forming an inverted v-shaped notch, with coxal setae located on each arm as figured. Apodeme of suctorial plate squarish; suctorial plate broad with well sclerotized posterior frame, 3 suckers inside plate and 2 outside. Legs as for genus, with III & IV very short; tarsi I–III each with a small empodial claw, lacking on IV but with a very long whiplike seta. Pretarsi I & II large, bulbous and appearing like suckers. Tarsi I & II each with 1 narrow lanceolate seta and 2 solenidia; tarsus III with 4 broad lanceolate setae; no such setae on tarsus IV. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 1; Genu–2, 2, 1, 0; Tibia–2 (1), 2 (1), 2, 1; Tarsus–5 (2), 5 (1), 5, 3.

Adults. Unknown.

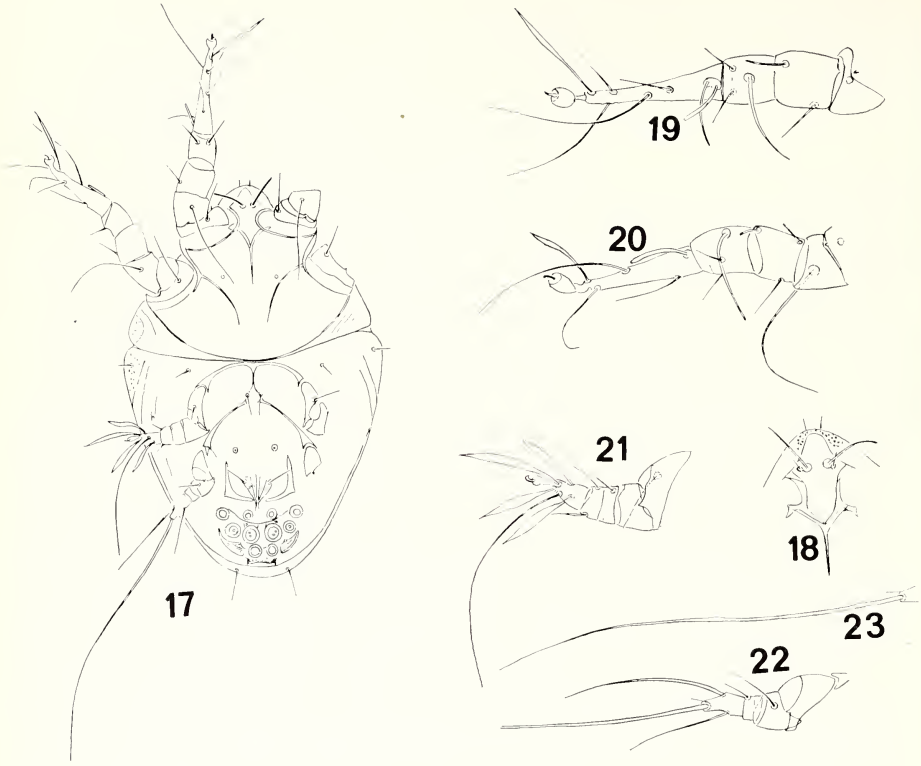
Holotype. Hypopial nymph, U. S. National Museum type no. 3685, Beaver, Utah, August 4, 1954, taken on a sphecid wasp, by Knowlton & Davis.

Paratypes. Fifteen hypopial nymphs with the same data as holotype. Deposited in U. S. National Museum and N. Y. State Museum & Science Service, Albany.

Remarks. The hypopus of this species is similar to that of *V. concellaria* Cooreman and *V. thomasi,* n. n. but differs by the structure of coxal apodemes III–IV, the shape of the suctorial apodeme, and the absence of the posterior sternum; also **utahensis** has fairly long coxal and genital setae.

Genus *Schulzea* Zakhvatkin, 1941.

The hypopus discussed here is probably not a true *Schulzea*; it possesses certain features of *Lackerbauria* Zakhvatkin as defined by Zakhvatkin (1941). [Baker (1962) described 2 species in *Lackerbauria*; we have reasons to believe that these species are not *Lackerbauria* but belong to an undescribed genus in Acaridae.] The segmented gnathosoma which is hidden beneath a sclerotized rostral protrusion, the very short dorsal setae, and widely separated, closed coxal fields II & III are characteristic of the type-species: *S. pamirensis* Zakhvatkin. As in *Lackerbauria,* empodial claws are present on tarsi I–IV,



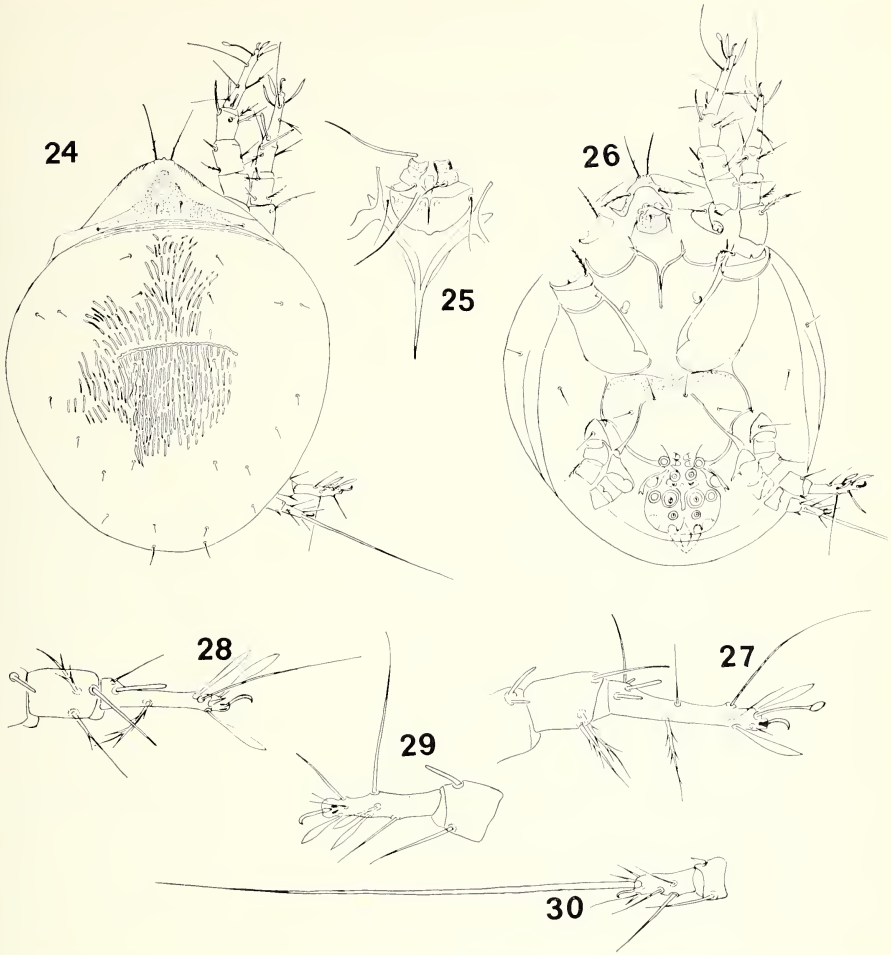
Vidia (*Euvidia*) *utahensis*, n. sp. 17, ventral view; 18, details of gnathosoma; 19, leg I; 20, leg II; 21, leg III; 22, leg IV; 24, distal segment of leg IV.

including a large, very long distal seta on tarsus IV. The genus *Schulzea* has been previously known only from Russia, where it is represented by 2 species. The hypopi of *Schulzea* are found associated with megachild and halictid bees, whereas those of *Lackerbauria* are found on wasps. Until we have seen specimens of typical *Lackerbauria,* it would be best to retain them in the present genus.

Schulzea **zakhvatkin**, n. sp.

(Figures 24–30)

Hypopus. Idiosoma 351 μ long, 287 μ wide; ovoid. Propodosoma small, produced anteriorly and with punctate arched sclerotization. Hysterosoma arched over propodosoma, densely punctate and with pattern of short, longitudinal striations as figured. All dorsal setae very short; chaetotaxy as figured. Gnathosoma small, segmented and hidden beneath a sclerotized rostral protrusion as figured; this structure bears 2 pairs of fairly long pectinate setae; distal segments of gnathosoma well separated, with 1 short seta on each segment. Sternum strongly y-shaped, free, short; coxal fields II & III closed, widely separated, with a pair of setae opposite coxal apodome III. Anterior coxal setae replaced by a pair of large suckers. Suctorial plate large, well sclerotized, open anteriorly; 3 pairs



Schulzea zakhvatkini, n. sp. 24, dorsal view; 25, details of gnathosoma; 26, ventral view; 27, tibia and tarsus I; 28, tibia and tarsus II; 29, tibia and tarsus III; 30, tibia and tarsus IV.

of suckers inside plate and 1 small pair on open portion; a pair of setae and suckers widely separated anterior to suctorial plate, and a pair of thickened discs between coxal apodemes and suctorial plate (as figured). Legs I & II with pectinate dorsal setae on all segments; empodial claws present on tarsi I–IV, and large, very long seta at end of tarsus IV. Tarsus I with 2 lanceolate and 1 sucking seta, II & III with 3 and 4 lanceolate setae respectively; no such setae on IV. Genu and tarsus of leg I each with duplex solenidia. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 1; Genu–2 (2), 2 (1), 2, 0; Tibia–3, 3, 2, 2; Tarsus–9 (3), 7 (1), 7, 8.

Adults. Unknown.

Holotype. Hypopial nymph, U. S. National Museum type no. 3686, taken on *"Halictus* sp. collected from Lucern" (no date) (PL–480, project Hissar, India), sent by F. D. Parker, Logan, Utah.

Paratype. One hypopial nymph, on same slide with holotype and with same data, in the U. S. National Museum.

Remarks. From Zakhvatkin's description and figure of *S. pamirensis* Zakhvatkin, *S.* **zakhvatkini** n. sp. appears related to *S. pamirensis. S. pamirensis,* however, has tarsus I shorter than genu and tibia I taken together and has 2 pairs of coxal suckers, and legs I & II lack pectinate and lanceolate setae. The structure of the suctorial plate is similar to that of *S. caucasus* Zakhvatkin but in **zakhvatkini** n. sp. tarsus I is as long as the genu and tibia I taken together, whereas they are longer in *caucasus.* Also, the gnathosoma of *caucasus* is not hidden ventrally.

Family Chaetodactylidae

Genus *Sennertia* Oudemans, 1905.

This genus contains 13 species, of which 11 are known only from hypopial nymphs; they are all associated with bees belonging to the subfamily Xylocopinae. The hypopi of *Sennertia* are characterized by having a hysterosomal shield, a striate pattern on the uncovered areas of the idiosoma, a very large twisted claw distally on tarsi I–III and a very long, whiplike seta on tarsus IV. The gnathosoma is lacking or reduced, represented by a pair of short setae. *S.* **americana** n. sp. is the first described member of this genus in North America.

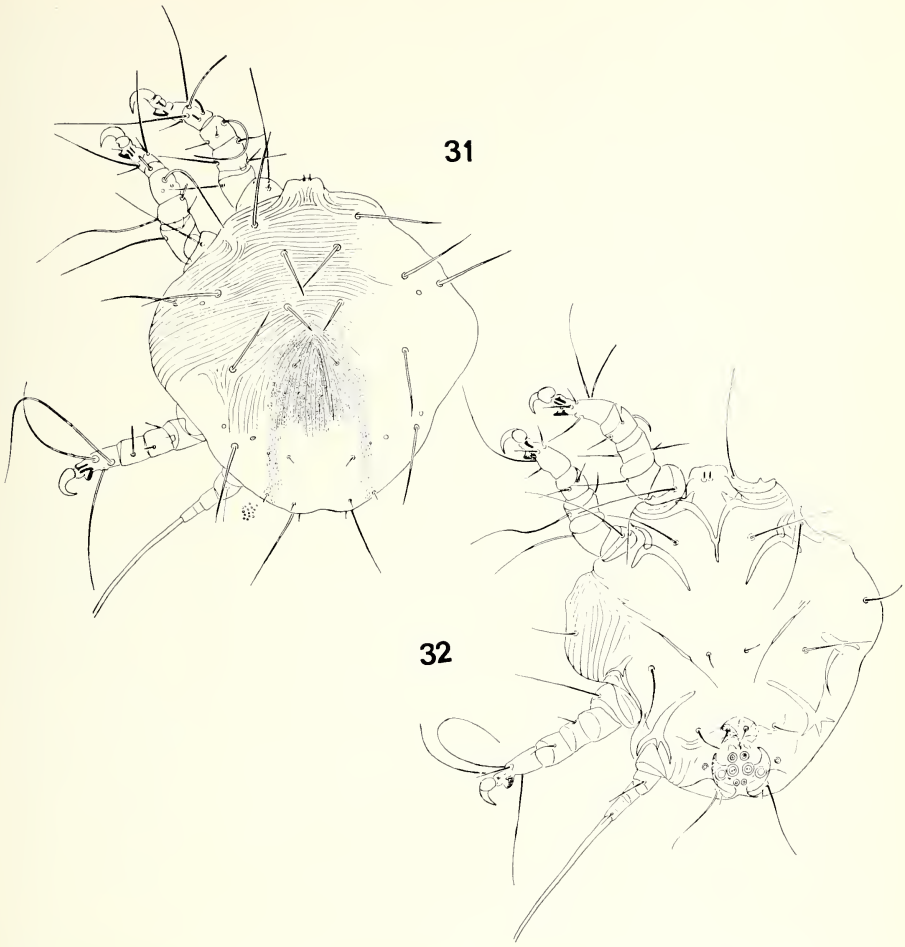
Sennertia **americana** n. sp.

(Figures 31, 32)

Hypopus. Idiosoma 319 μ long, 313 μ wide; almost quadrangular. Propodosoma with pattern of broken transverse striae, very long and strong dorsal setae *Sce* & *Sci.* Hysterosoma with a small, narrow shield, reaching anteriorly halfway to seta d_1 and with concentric striate pattern on uncovered areas; hysterosomal shield minutely punctate and well sclerotized (in recently molted specimens this shield is not sclerotized), with longitudinal pattern of broken striae, the posterior edge incised medially and folded on ventral surface of hysterosoma. Setae d_2, d_3 & d_4 very short, situated on hysterosomal shield; seta d_1 strong, as long as *Sci.* Setae *Sce, h*$_1$, *h*$_c$, *la* & *lp* very strong, long and almost subequal in length. Setae *Sai* & *pa* ventral in position. Gnathosoma lacking, only a pair of short, almost spinelike setae present. Sternum v-shaped, short. Apodemes II, III & IV free, reduced as figured. Coxal setae long and slender. Suctorial plate small, rounded, well sclerotized except anterior ⅓; 3 pairs of suckers inside the plate and 1 pair on the open portion; a small disc present on each side of the plate as figured. Legs as for genus, with very large twisted claw borne on each end of tarsi I–III; end of tarsus IV with a large, very long, whiplike seta. Tarsi I–III thickened distally, each with a thumblike lateral process. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 1; Genu–3, 3, 2, 0; Tibia–3, 3, 1, 0; Tarsus–5 (3), 4 (2), 4, 1 (terminal seta).

Adults. Unknown.

Holotype. Hypopial nymph, Albany, New York, June 6, 1901, taken on carpenter bee, *Xylocopa virginica* (L.) by M. D. Delfinado. Deposited in N. Y. State Museum & Science Service, Albany.



Sennertia americana, n. sp. 31, dorsal view; 32, ventral view.

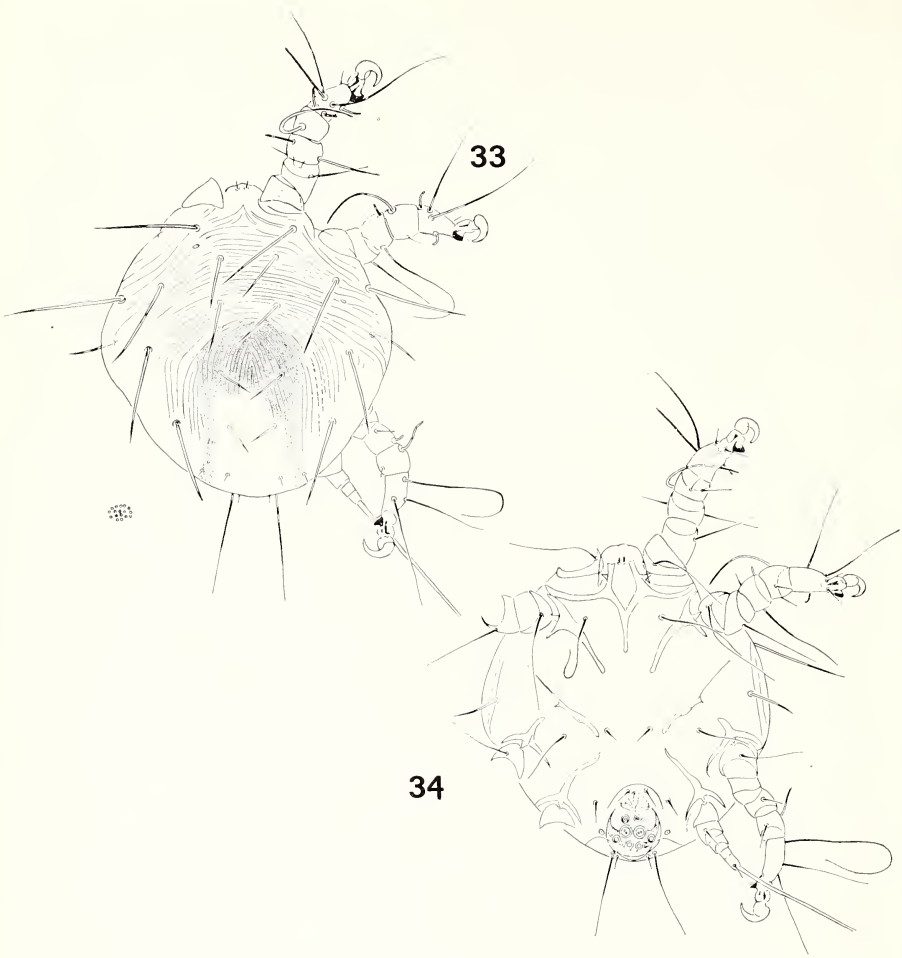
Paratypes. Forty-eight hypopial nymphs, Albany & Poughkeepsie, New York, June 6, 1901 and April, 1901, taken on carpenter bees by M. D. Delfinado; 11 hypopial nymphs, Lee County, Florida, Feb. 28, 1937, taken on *X. virginica* (no coll.). Deposited in U. S. National Museum and N. Y. State Museum & Science Service collections.

Remarks. The very short dorsal setae d_2, d_3, & d_4 on the hysterosomal shield is characteristic of *S.* **americana**; and like *S.* **ignota**, n. sp. and *S. alfkeni* Oudemans, it has a thumblike lateral process on tarsi I-III.

Sennertia **ignota**, n. sp.

(Figures 33, 34)

Hypopus. Idiosoma 300 μ long, 287 μ wide; almost rounded. Propodosoma and uncovered areas of hysterosoma with striae, the pattern on prodosoma broken transversely,



Sennertia ignota, n. sp. 33, dorsal view; 34, ventral view.

that on hysterosoma more or less concentric around hysterosomal shield. Dorsal setae *Sce*, h_1, h_c, *la* & *lp* very long and strong, subequal in length; *Sci* & d_1 subequal in length and shorter than above setae; d_2 & d_3 subequal and shorter than d_1 or *Sci*; d_4 very short to minute. Hysterosomal shield small and narrow, reaching as far forward as d_1, surface minutely punctate and with longitudinal broken striation pattern, the posterior edge deeply incised medially and folded on ventral surface of hysterosoma; setae d_2, d_3 & d_4 located on the shield. Setae *Sai* & *pa* ventral and situated on the folded hysterosomal shield. Gnathosoma lacking, a pair of minute setae present. Sternum y-shaped. Coxal apodemes II, III, IV free, reduced. Coxal setae very long, slender. Suctorial plate rounded, open at anterior half, with well-sclerotized frame, 3 pairs of suckers inside the plate and 1 pair on the open portion; one very small disc present on each side of the plate. Legs as for genus. Tarsi I–III each with a very large claw on each end, and thumblike

lateral process distally; end of tarsus IV with a very long seta. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 1, 1; Genu–3, 3, 2, 0; Tibia–3, 3, 2, 0; Tarsus–4 (3), 4 (1), 4, 1 (terminal seta).

Adults. Unknown.

Holotype. Hypopial nymph, Talara, Peru, May 6, 1934, taken on *Xylocopa* sp. by M. D. Delfinado. Deposited on N. Y. State Museum & Science Service, Albany.

Paratypes. Ten hypopial nymphs, with the same data as for the holotype. Deposited in U. S. National Museum and N. Y. State Museum & Science Service collections.

Remarks. This species is very similar to *S.* **americana** n. sp. differing by the shape of the idiosoma, the number of strong dorsal setae and the leg chaetotaxy. *S.* **americana** has d_2, d_3 & d_4 very short, whereas only d_4 is minute in *S.* **ignota**; all other dorsal setae are strongly developed.

Sonnertia **indica**, n. sp.

(Figures 35, 36)

Hypopus. Idiosoma 325 μ long, 255 μ wide; broadly oval and narrowing posteriorly. Propodosoma and uncovered areas of hysterosoma with striae, pattern on prodosoma more or less concentric, that on hysterosoma longitudinal laterally. Hysterosomal shield large, tongueshaped, minutely punctate and with longitudinal broken striate pattern as figured, the posterior edge slightly folded ventrally. Dorsal setae *Sce*, *hi*, *he*, *la* & *lp* long and strong. *Sci*, d_1, d_2, d_3 & D_4 very short to minute. Setae d_1–d_4 situated on hysterosomal shield. *Sai* & *pa* marginal. Gnathosoma lacking, represented by a pair of fairly long setae. Sternum v-shaped; coxal apodemes II–IV reduced, free; coxal setae fairly long, slender. Suctorial plate rounded, frame well sclerotized, 3 pairs of suckers inside the plate and 1 pair on the open portion. Legs as for genus. Tarsi III, III & IV not thickened distally and lacking lateral processes. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 1; Genu–3, 3, 2, 0; Tibia–3, 3, 1, 0; Tarsus–5 (3), 4 (1), 4, 1 (terminal seta).

Adults. Unknown.

Holotype. Hypopial nymph, U. S. National Museum type, no. 3687, India, 1.3.69, taken on *Tithitis binghami* (Cockerell) (PL–480, Hissar, India), sent by F. D. Parker, Logan, Utah.

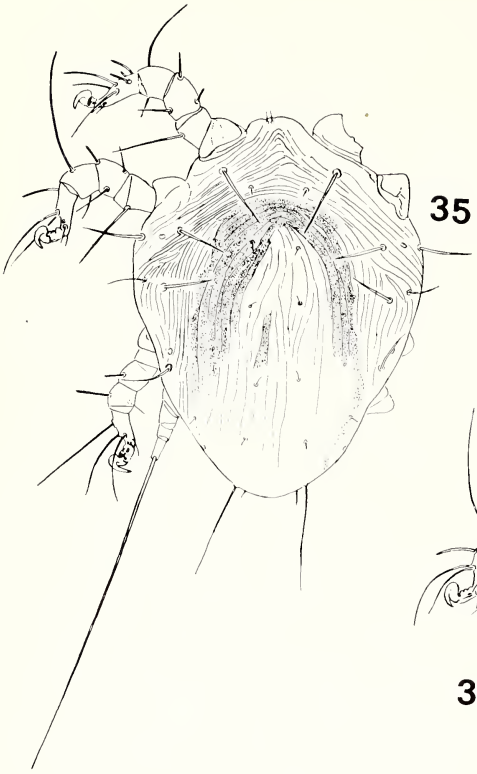
Paratypes. Two hypopial nymphs with the above data as holotype. Deposited in N. Y. State Museum & Science Service, Albany.

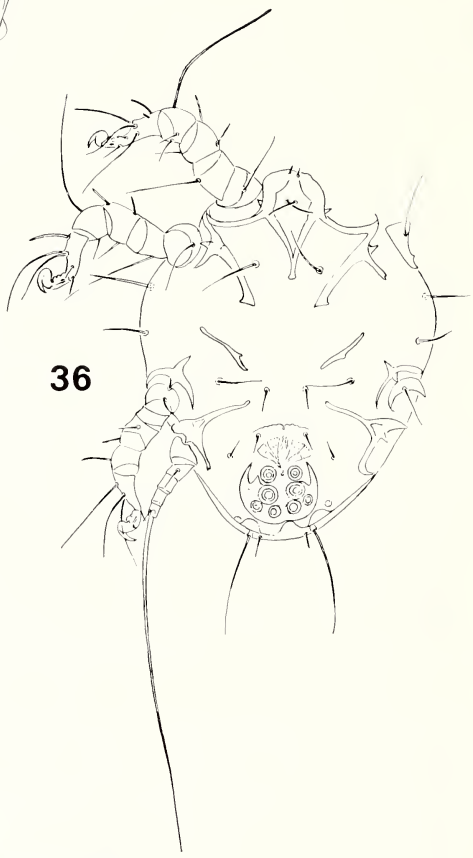
Remarks. The hypopus of *S.* **indica** may be distinguished from its closely related species *S.* **robusta**, n. sp. by the long and strong dorsal seta *lp*; this seta is minute in *S.* **robusta**.

Sennertia **robusta**, n. sp.

(Figures 37, 38)

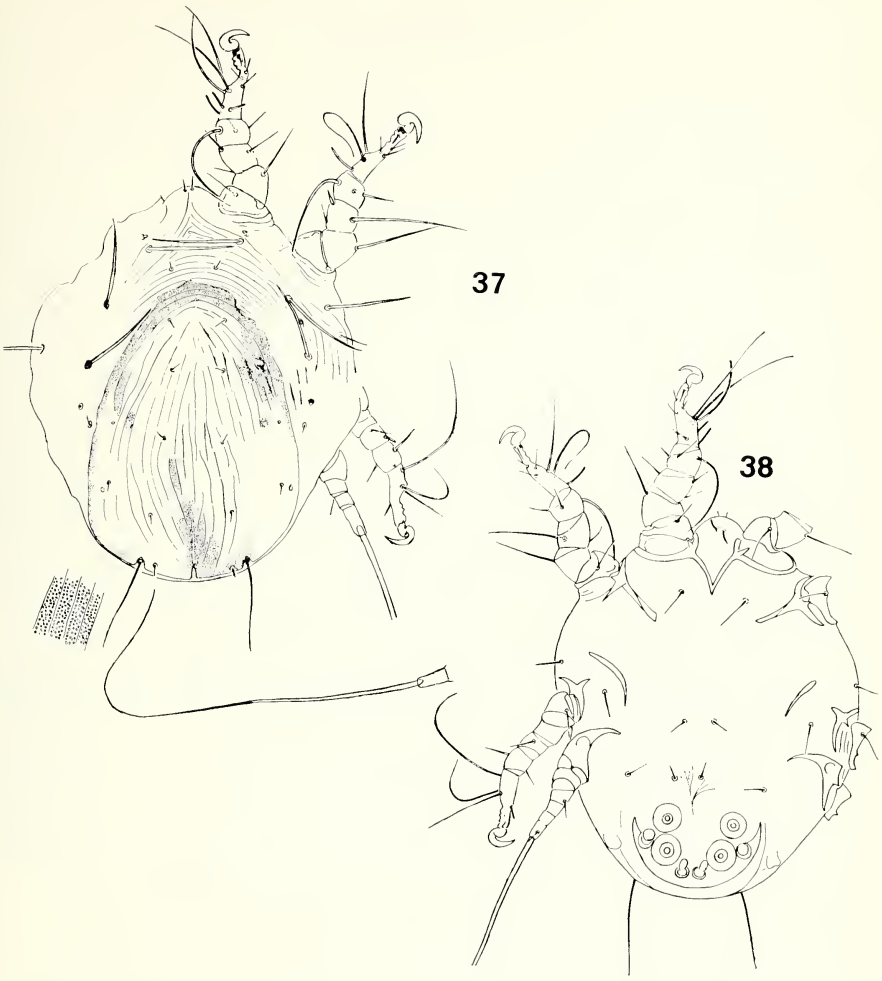
Hypopus. Idiosoma 355 μ long, 306 μ wide; broad oval. Propodosoma and uncovered areas of hysterosoma with more or less concentric striate pattern. Hysterosomal shield large, reaching anteriorly to seta *Sci*, minutely punctate and with strong longitudinal broken striate pattern as figured, the posterior edge not folded ventrally. Dorsal setae





Sennertia indica, n. sp. 35, dorsal view; 36, ventral view.

Sce, he, hi & *la* very strong and long; setae *Sci,* d_1, d_2, d_3, d_4 & *lp* minute; d_1–d_4 situated on hysterosomal plate; *Sai* & *pa* submarginal and dorsal in position. Gnathosoma lacking, only a pair of short setae present. Sternum v-shaped. Coxal apodemes II, III & IV free, reduced. Coxal setae fairly long, slender. Suctorial plate large with posterior ½–⅔ of the frame sclerotized; 3 pairs of suckers inside the plate and 1 large pair on the



Sennertia robusta, n. sp. 37, dorsal view; 38, ventral view.

open portion; 1 large disc present on each side of the plate. Legs as for genus. Tarsi I–III without distal lateral process. Chaetotaxy of legs I–IV: Trochanter–1, 1, 1, 0; Femur–1, 1, 0, 0; Genu–3, 3, 2, 1; Tibia–3, 3, 2, 0; Tarsus–5 (3), 5 (1), 4, 1 (terminal seta).

Adults. Unknown.

Holotype. Hypopial nymph, U. S. National Museum type no. 3688, India, 1.3.68, taken on megachilid bee (PL–480, Hissar, India), sent by F. D. Parker, Logan, Utah.

Paratypes. Two hypopial nymphs, "India," 1.3.69 & 26.2.69, taken from *Xylocopa* sp. (no other data). Deposited in the U. S. National Museum collection.

Remarks. This species is very similar to *S.* **indica,** n. sp. but the large size, leg chaetotaxy and minute dorsal seta *lp* will readily distinguish *S.* **robusta.**

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